

# **Brain Science And Psychotherapy: *What's the Next Step?***

**Psychotherapy Networker Symposium**

**March 21, 2014**

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**The Wellspring Institute for Neuroscience and Contemplative Wisdom**

**[WiseBrain.org](http://WiseBrain.org) [RickHanson.net](http://RickHanson.net)**

# Topics

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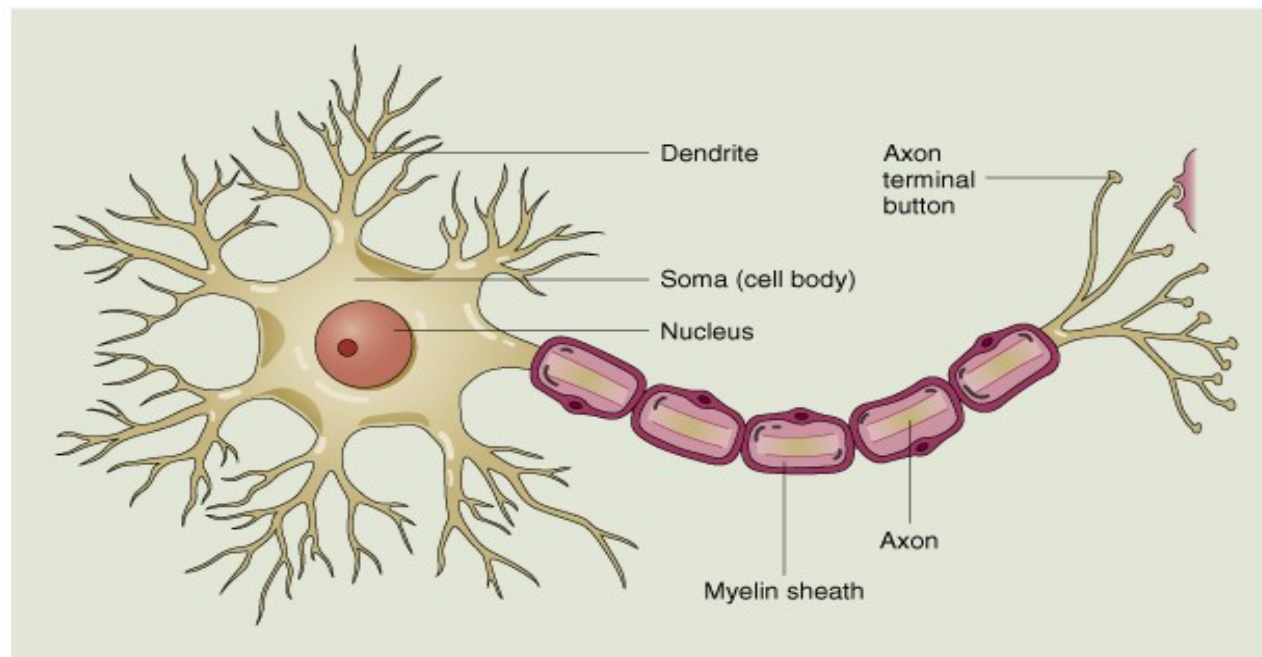
- **Self-directed neuroplasticity**
- **Benefits and pitfalls of neuroscience in therapy**
- **Growing inner strengths**
- **Taking in the good**




# **Self-Directed Neuroplasticity**



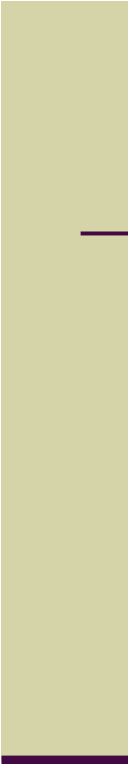
# A Neuron



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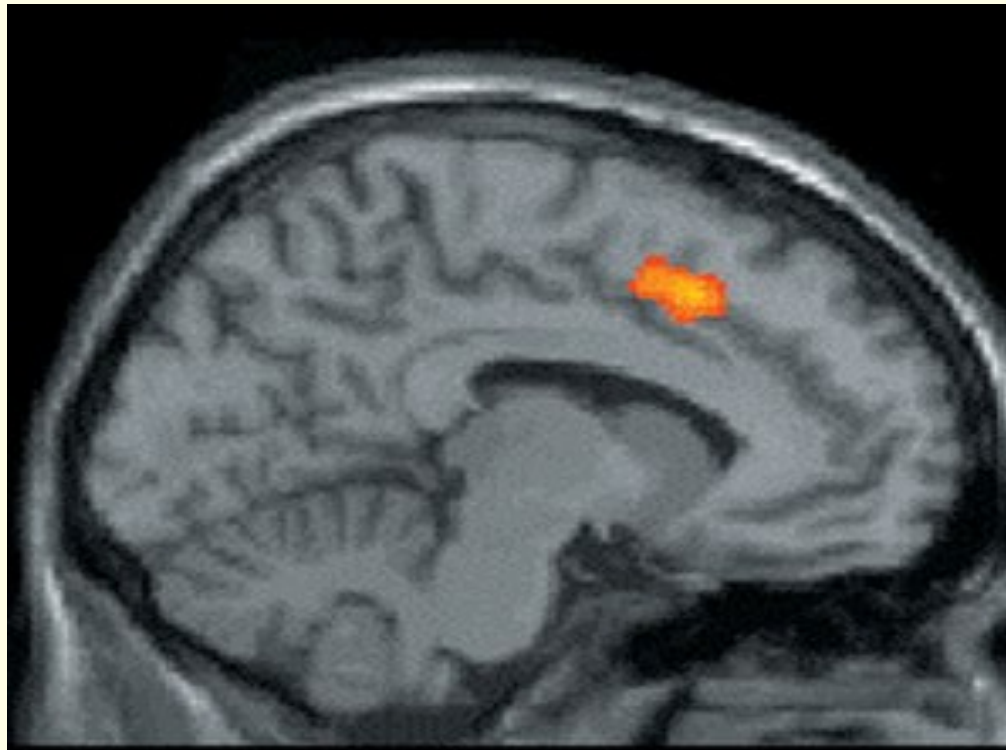



**Mental activity entails  
underlying neural activity.**



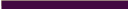
# Steadiness of Mind

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**Repeated mental activity entails  
repeated neural activity.**



**Repeated neural activity  
builds neural structure.**

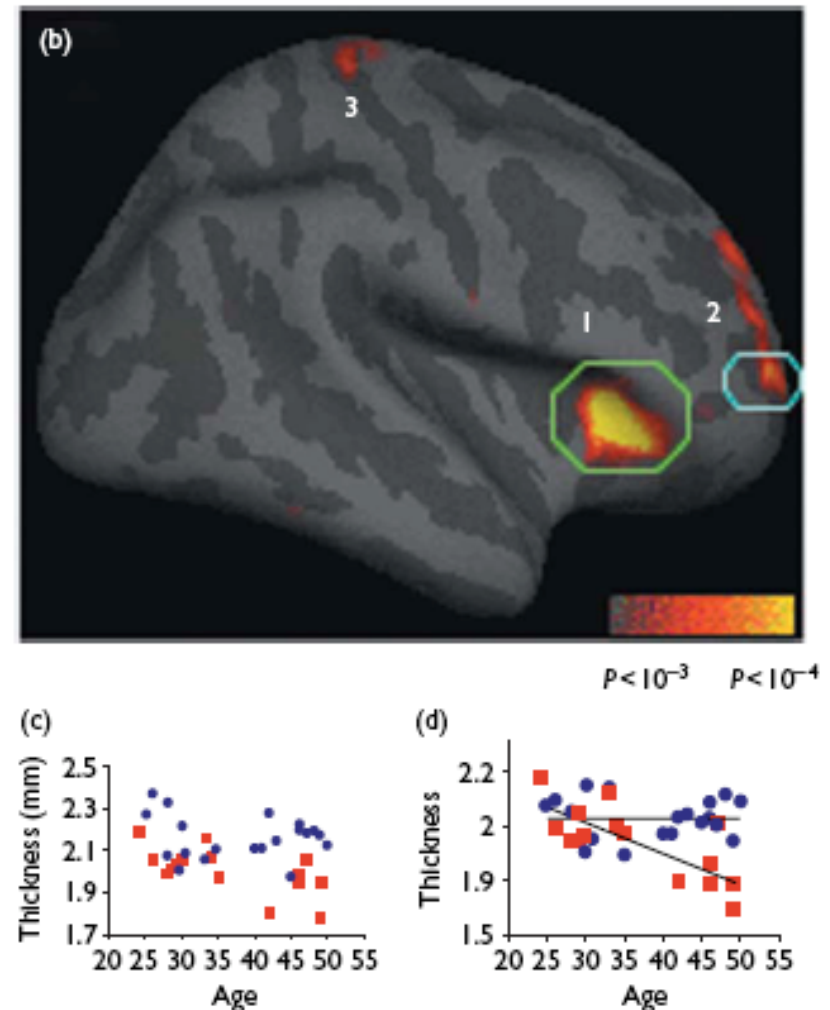


A detailed illustration of a neural network. Numerous yellow, thread-like axons crisscross the frame, connecting various cell bodies. In the center, a single neuron is highlighted with a bright green nucleus and a glowing green cell body, making it stand out from the yellow network. The background is dark, emphasizing the luminous quality of the neural structures.

Neurons that fire together,

wire together.

Lazar, et al. 2005.  
Meditation  
experience is  
associated  
with increased  
cortical thickness.  
*Neuroreport*, 16,  
1893-1897.



# **Self-Directed Neuroplasticity**


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**We can use the mind**

**To change the brain**

**To change the mind for the better**

**To benefit ourselves and other beings.**



# **Benefits and Pitfalls Of Bringing Neuroscience into Psychotherapy**

# Grounding in the Brain – Benefits 1

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- **Innovating**

- Neurofeedback
- Erasing fear memories, not just over-writing them

# Grounding in the Brain – Benefits 2

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- **Innovating**

- Neurofeedback
- Erasing fear memories, not just over-writing them

- **Organizing**

- Human DNA and brain; evolutionary neuropsychology
- Common ground across perspectives and practices

# Grounding in the Brain – Benefits 3

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## ■ Innovating

- Neurofeedback
- Erasing fear memories, not just over-writing them

## ■ Organizing

- Human DNA and brain; evolutionary neuropsychology
- Common ground across perspectives and practices

## ■ Motivating

- Concrete, in the body, *physical*; efforts bear tangible fruit
- Status of medicine, hard science

# Grounding in the Brain – Benefits 4

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## ■ Innovating

- Neurofeedback
- Erasing fear memories, not just over-writing them

## ■ Organizing

- Human DNA and brain; evolutionary neuropsychology
- Common ground across perspectives and practices


## ■ Motivating

- Concrete, in the body, *physical*; efforts bear tangible fruit
- Status of medicine, hard science

## ■ Highlighting


- Nonverbal affective and somatic processes
- Installation phase of learning – need to turn passing mental states into stable neural traits for any lasting value





*We shall not cease from exploration  
And the end of all our exploring  
Will be to arrive where we started  
And know the place for the first time.*

T. S. Eliot



*To see what is in front of one's nose  
takes a constant struggle.*

George Orwell

# Grounding in the Brain – Pitfalls 1

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- **Over-simplifying**

- Over-localizing function (e.g., empathy = mirror neurons)
- Exaggerated, compelling terms (“God-gene,” “female brain”)

# Grounding in the Brain – Pitfalls 2

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- **Over-simplifying**

- Over-localizing function (e.g., empathy = mirror neurons)
- Exaggerated, compelling terms (“God-gene,” “female brain”)

- **Adding little new meaning**

- Replacing psych terms with neuro (“the amygdala made me do it”)

# Grounding in the Brain – Pitfalls 3

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- **Claiming authority**

- Asserting power with clients; propelling career success

# Grounding in the Brain – Pitfalls 4

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- **Over-simplifying**

- Over-localizing function (e.g., empathy = mirror neurons)
- Exaggerated, compelling terms (“God-gene,” “female brain”)

- **Adding little new meaning**

- Replacing psych terms with neuro (“the amygdala made me do it”)

- **Claiming authority**

- Asserting power with clients; propelling career success

- **Underestimating the mind**

- Most big changes in *psyche* involve tiny changes in *soma*; mental plasticity holds more promise than neural plasticity.
- Ducking existential choices in values; naturalistic fallacy



# **Growing Inner Strengths**

Two wolves in the heart

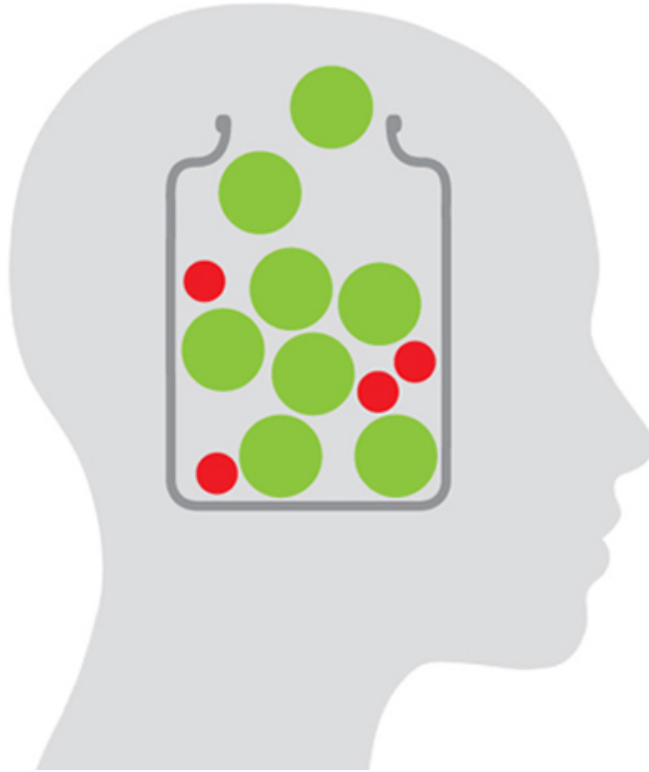




# Inner Strengths Include

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- **Capabilities** (e.g., mindfulness, insight, emotional intelligence, resilience, executive functions, impulse control)
- **Positive emotions** (e.g., gratitude, self-worth, love, self-compassion, secure attachment, gladness, awe, serenity)
- **Attitudes** (e.g., openness, determination, optimism, confidence, approach orientation, tolerance, self-respect)
- **Somatic inclinations** (e.g., vitality, relaxation, grit, helpfulness)
- **Virtues** (e.g., wisdom, patience, energy, generosity, restraint)



Inner Strengths Are Built From Brain Structure

# Growing Inner Strengths

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Inner strengths are grown mainly from positive mental states that are turned into positive neural traits.

Change in neural structure and function (learning, memory) involves activation and installation.

We grow inner strengths by internalizing positive experiences of them and their related factors.

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**Without this installation, there is no change in the brain - no useful learning, no healing, no growth.**

**Positive activation without installation is pleasant, but has no lasting value.**

**Meanwhile, negative mental states are being preferentially installed into neural structure.**

# The Brain's Negativity Bias

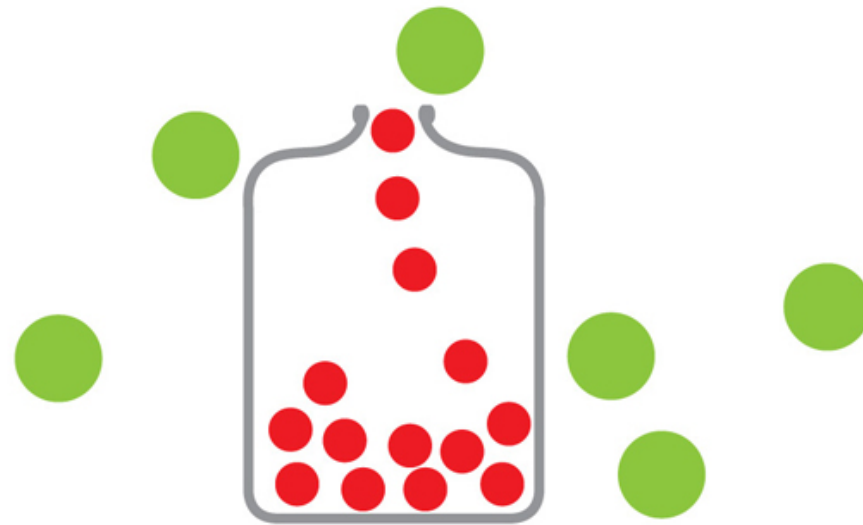
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- As our ancestors evolved, avoiding “sticks” was more important for survival than getting “carrots.”
- Negative stimuli:
  - More attention and processing
  - Greater motivational focus: loss aversion
- Preferential encoding in implicit memory:
  - We learn faster from pain than pleasure.
  - Negative interactions: more impactful than positive
  - Easy to create learned helplessness, hard to undo
  - Rapid sensitization to negative through cortisol



# Stone age brains in the 21st century





## The Negativity Bias

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**Just having positive experiences is not enough.**

**They pass through the brain like water through a sieve, while negative experiences are caught.**


**This is the fundamental weakness in most psychotherapy, human resources training, and spiritual practices.**



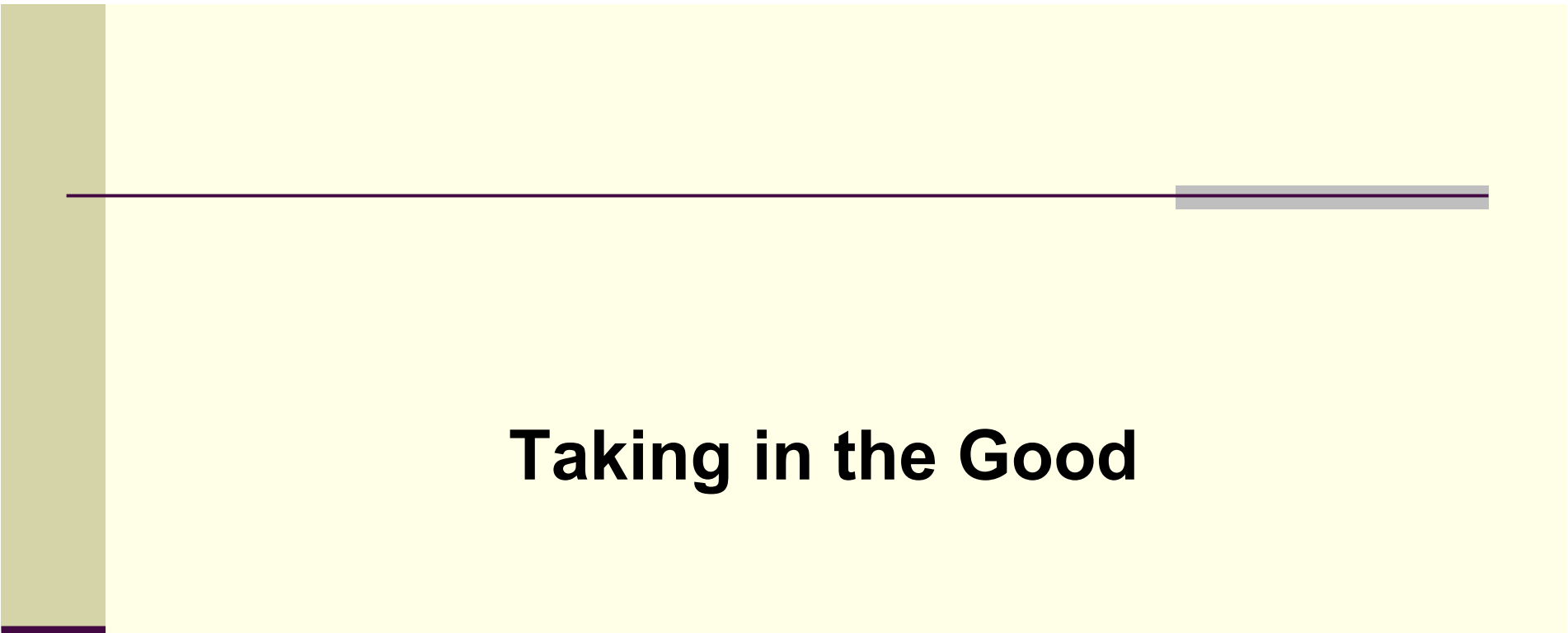
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*The same research that proves therapy works  
shows no improvement in outcomes  
over the last 30 or so years.*

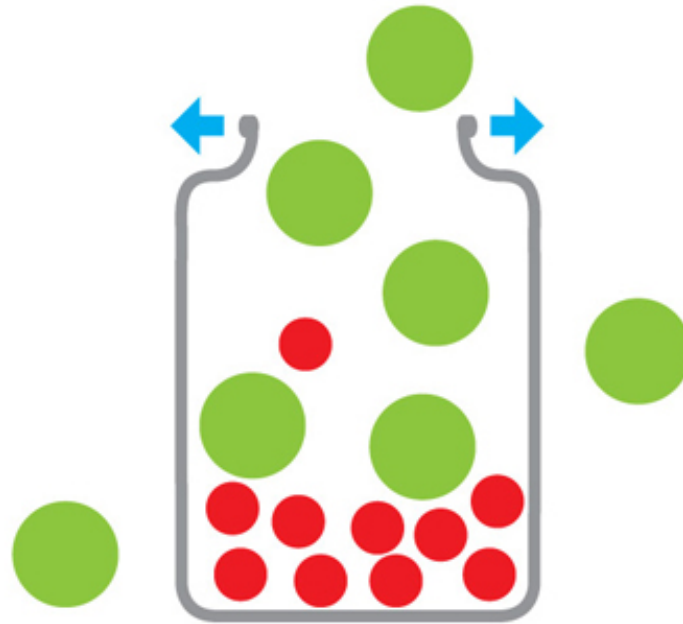
Scott Miller



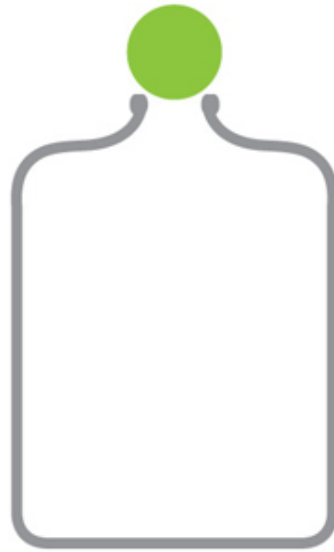
*We can deliberately use the mind  
to change the brain for the better.*



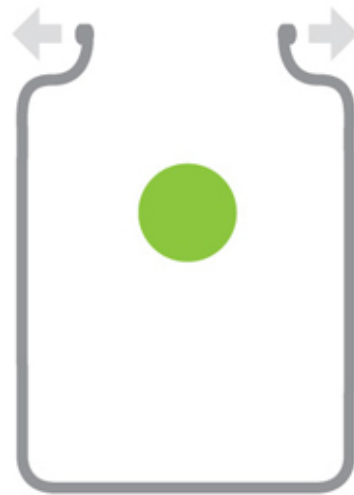
# **Taking in the Good**



Learning to Take in the Good



Have a Good Experience



Enrich It

# “Enriching” Factors

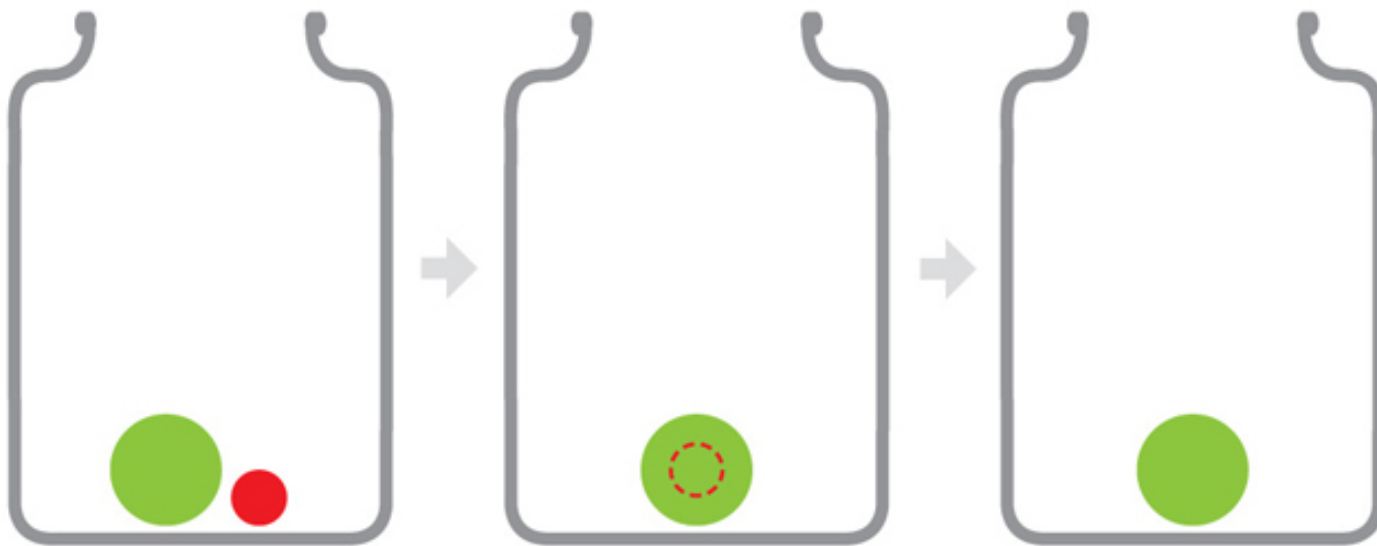
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- Duration
- Intensity
- Multimodality –perception, emotion, desire, action
- Novelty
- Personal relevance



Absorb It



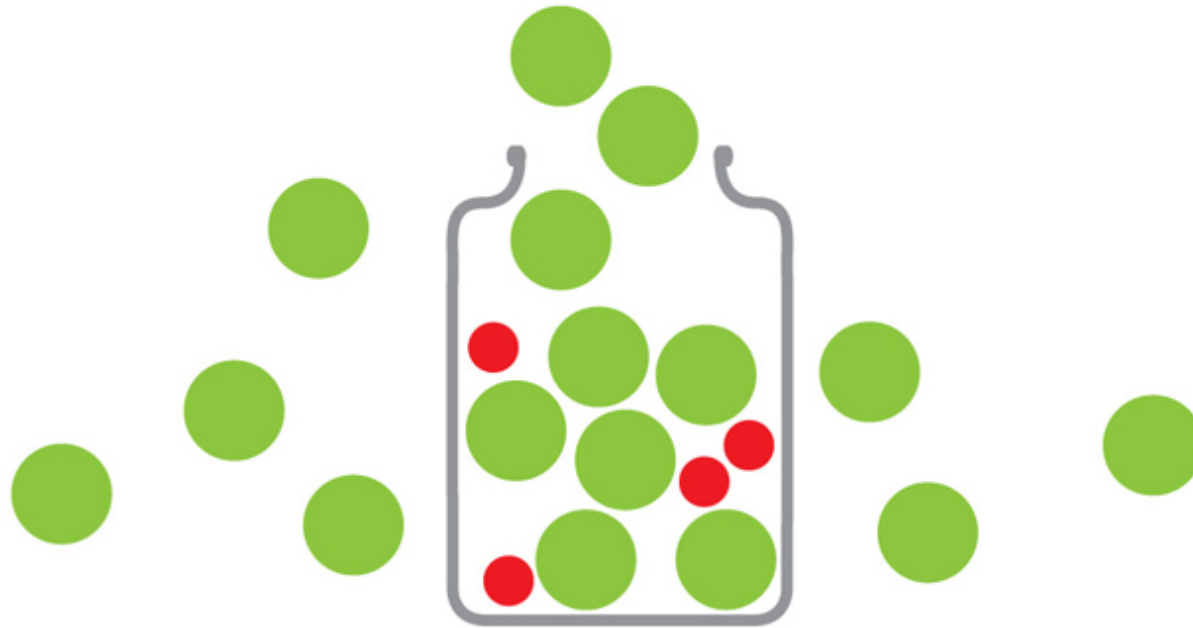


Link Positive and Negative Material

# HEAL by Taking in the Good

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1. Have a positive experience. Notice it or create it.
2. Enrich the experience through duration, intensity, multimodality, novelty, personal relevance.
3. Absorb the experience by intending and sensing that it is sinking into you as you sink into it.
4. Link positive and negative material. [optional]



Have It, Enjoy It

# Let's Try It

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- Taking in the good of **compassion**
  - Have the experience - bring to mind someone you care about . . . Feel caring . . . Wish that he or she not suffer . . .  
Open to compassion
  - Enrich it
  - Absorb it

# It's Good to Take in the Good

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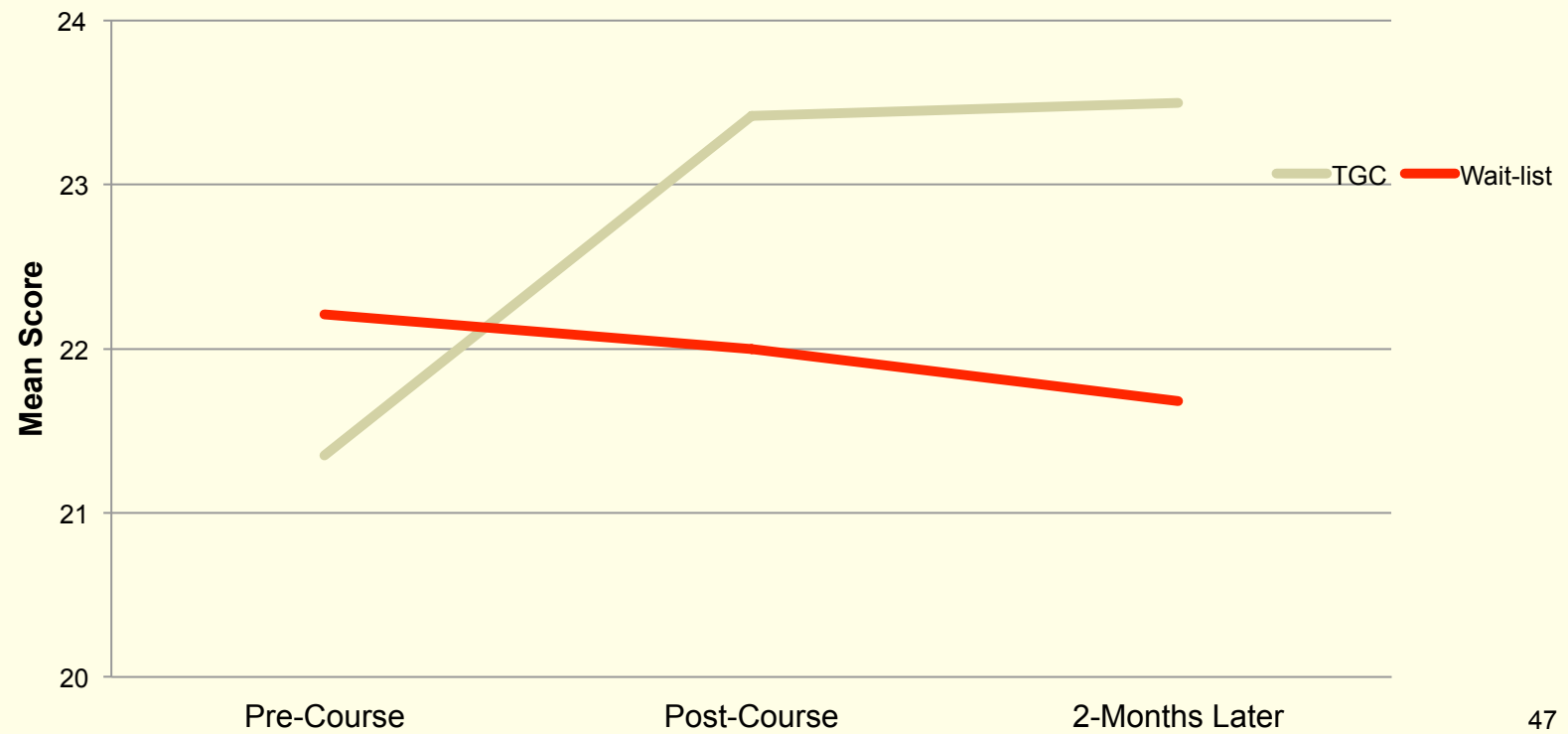
- Development of specific inner strengths
  - General - resilience, positive mood, feeling loved
  - “Antidote experiences” – Healing wounds, filling deficits
- Implicit benefits:
  - Shows that there is still good in the world
  - Being active rather than passive
  - Treating yourself kindly, like you matter
  - Training of attention and executive functions
- Sensitizes brain to positive: like Velcro for good

# Research on the HEAL Process

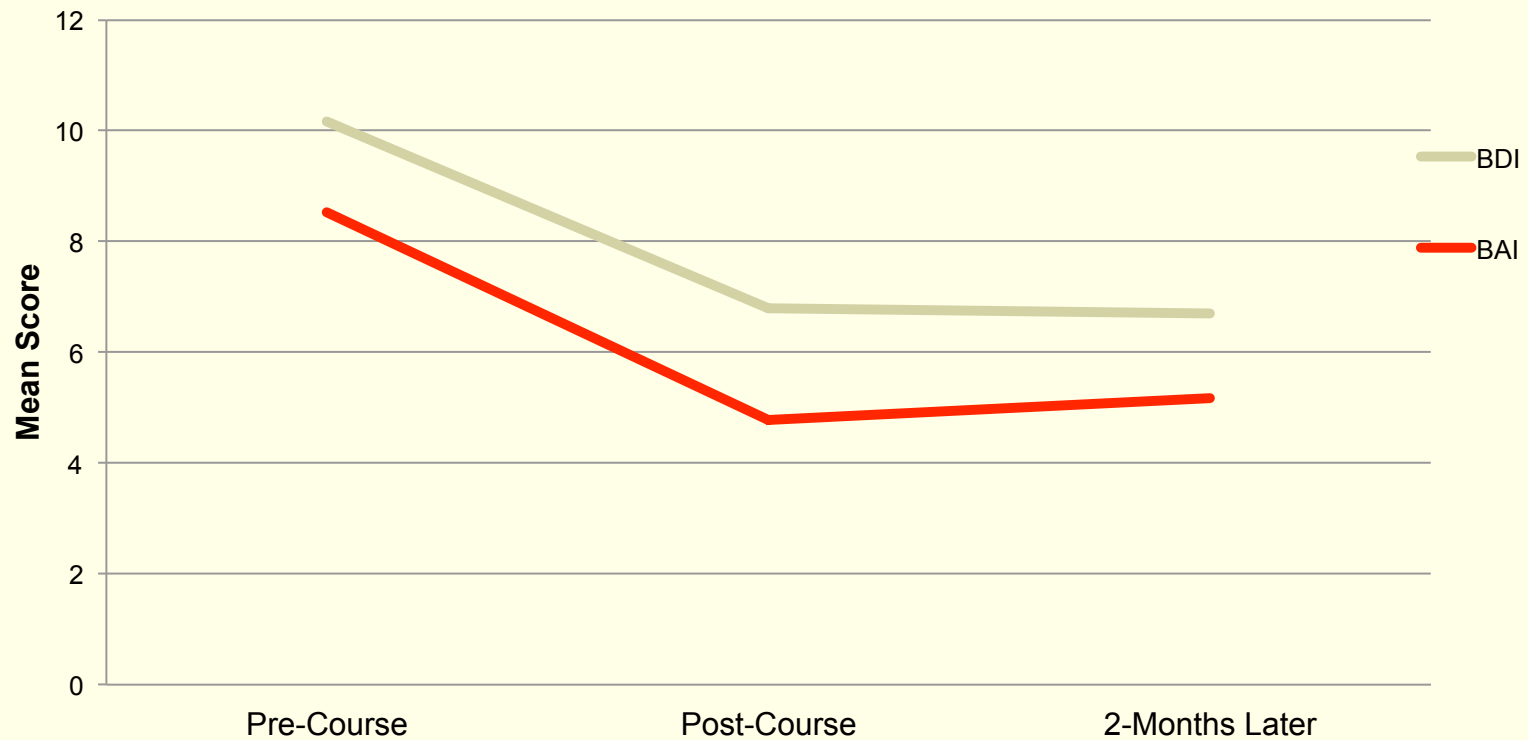
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- With collaborators from the University of California, a 2013 study on the HEAL course, using a randomized waitlist control group design (46 subjects).
- Course participants, compared to the control group, reported more Contentment, Self-Esteem, Satisfaction with Life, Savoring, and Gratitude.
- After the course and at two month follow-up, pooled participants reported more Love, Compassion, Self-Compassion, Mindfulness, Self-Control, Positive Rumination, Joy, Amusement, Awe, and Happiness, and less Anxiety and Depressed Mood.

# Self-Esteem



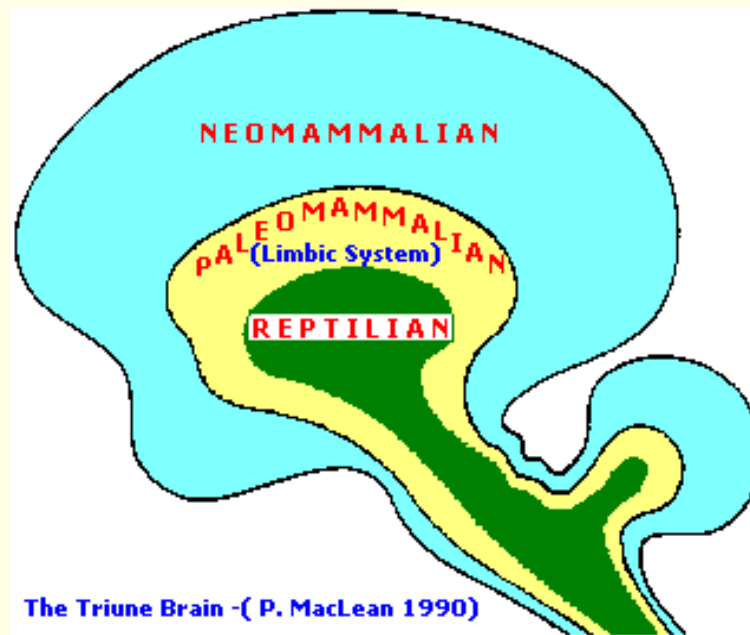
## Combined Sample: Depression (BDI) & Anxiety (BAI)





# Evolutionary History

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## The Triune Brain

# Some Types of Resource Experiences

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## **Avoiding Harms**

- Feeling basically alright right now
- Feeling protected, strong, safe, at peace
- The sense that awareness itself is untroubled

## **Approaching Rewards**

- Feeling basically full, the enoughness in this moment as it is
- Feeling pleased, glad, grateful, satisfied
- Therapeutic, spiritual, or existential realizations

## **Attaching to Others**

- Feeling basically connected
- Feeling included, seen, liked, appreciated, loved
- Feeling compassionate, kind, generous, loving

# Pet the Lizard

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# Feed the Mouse

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# Hug the Monkey

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# Cultivation Undoes Craving

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- Taking in the good is an openness to experience while letting go of it.
- Much suffering and harm comes from “craving” – resisting unpleasant, grasping pleasant, or clinging to heartfelt – based on a deficit or disturbance of core needs (safety, satisfaction, connection).
- By repeatedly internalizing the felt sense of core needs being met, we reduce the sense of deficit or disturbance, and rest increasingly in a peace, happiness, and love that is independent of external conditions.
- With time, even the practice of cultivation falls away - like a raft that is no longer needed once we reach the farther shore.

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*Think not lightly of good, saying,  
"It will not come to me."*

*Drop by drop is the water pot filled.*

*Likewise, the wise one,  
gathering it little by little,  
fills oneself with good.*

Dhammapada 9.122

# Suggested Books

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See [www.RickHanson.net](http://www.RickHanson.net) for other suggestions.

- Austin, J. 2009. *Selfless Insight*. MIT Press.
- Begley, S. 2007. *Train Your Mind, Change Your Brain*. Ballantine.
- Carter, C. 2010. *Raising Happiness*. Ballantine.
- Hanson, R. (with R. Mendius). 2009. *Buddha's Brain: The Practical Neuroscience of Happiness, Love, and Wisdom*. New Harbinger.
- Johnson, S. 2005. *Mind Wide Open*. Scribner.
- Keltner, D. 2009. *Born to Be Good*. Norton.
- Kornfield, J. 2009. *The Wise Heart*. Bantam.
- LeDoux, J. 2003. *Synaptic Self*. Penguin.
- Linden, D. 2008. *The Accidental Mind*. Belknap.
- Sapolsky, R. 2004. *Why Zebras Don't Get Ulcers*. Holt.
- Siegel, D. 2007. *The Mindful Brain*. Norton.
- Thompson, E. 2007. *Mind in Life*. Belknap.



# Key Papers - 1

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See [www.RickHanson.net](http://www.RickHanson.net) for other scientific papers.

- Atmanspacher, H. & Graben, P. 2007. Contextual emergence of mental states from neurodynamics. *Chaos & Complexity Letters*, 2:151-168.
- Baumeister, R., Bratlavsky, E., Finkenauer, C. & Vohs, K. 2001. Bad is stronger than good. *Review of General Psychology*, 5:323-370.
- Braver, T. & Cohen, J. 2000. On the control of control: The role of dopamine in regulating prefrontal function and working memory; in *Control of Cognitive Processes: Attention and Performance XVIII*. Monsel, S. & Driver, J. (eds.). MIT Press.
- Carter, O.L., Callistemon, C., Ungerer, Y., Liu, G.B., & Pettigrew, J.D. 2005. Meditation skills of Buddhist monks yield clues to brain's regulation of attention. *Current Biology*, 15:412-413.

# Key Papers - 2

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- Davidson, R.J. 2004. Well-being and affective style: neural substrates and biobehavioural correlates. *Philosophical Transactions of the Royal Society*, 359:1395-1411.
- Farb, N.A.S., Segal, Z.V., Mayberg, H., Bean, J., McKeon, D., Fatima, Z., and Anderson, A.K. 2007. Attending to the present: Mindfulness meditation reveals distinct neural modes of self-reflection. *SCAN*, 2, 313-322.
- Gillihan, S.J. & Farah, M.J. 2005. Is self special? A critical review of evidence from experimental psychology and cognitive neuroscience. *Psychological Bulletin*, 131:76-97.
- Hagmann, P., Cammoun, L., Gigandet, X., Meuli, R., Honey, C.J., Wedeen, V.J., & Sporns, O. 2008. Mapping the structural core of human cerebral cortex. *PLoS Biology*, 6:1479-1493.
- Hanson, R. 2008. Seven facts about the brain that incline the mind to joy. In *Measuring the immeasurable: The scientific case for spirituality*. Sounds True.

# Key Papers - 3

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- Lazar, S., Kerr, C., Wasserman, R., Gray, J., Greve, D., Treadway, M., McGarvey, M., Quinn, B., Dusek, J., Benson, H., Rauch, S., Moore, C., & Fischl, B. 2005. Meditation experience is associated with increased cortical thickness. *Neuroreport*, 16:1893-1897.
- Lewis, M.D. & Todd, R.M. 2007. The self-regulating brain: Cortical-subcortical feedback and the development of intelligent action. *Cognitive Development*, 22:406-430.
- Lieberman, M.D. & Eisenberger, N.I. 2009. Pains and pleasures of social life. *Science*, 323:890-891.
- Lutz, A., Greischar, L., Rawlings, N., Ricard, M. and Davidson, R. 2004. Long-term meditators self-induce high-amplitude gamma synchrony during mental practice. *PNAS*, 101:16369-16373.
- Lutz, A., Slager, H.A., Dunne, J.D., & Davidson, R. J. 2008. Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences*, 12:163-169.

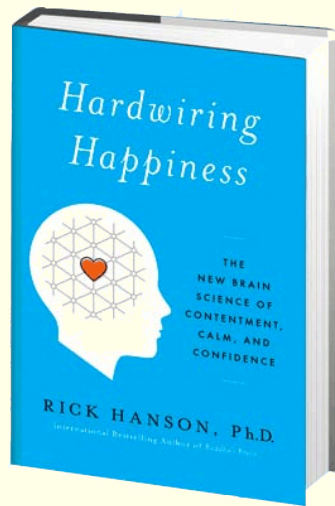
# Key Papers - 4

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- Rozin, P. & Royzman, E.B. 2001. Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, 5:296-320.
- Takahashi, H., Kato, M., Matsuura, M., Mobbs, D., Suhara, T., & Okubo, Y. 2009. When your gain is my pain and your pain is my gain: Neural correlates of envy and schadenfreude. *Science*, 323:937-939.
- Tang, Y.-Y., Ma, Y., Wang, J., Fan, Y., Feng, S., Lu, Q., Yu, Q., Sui, D., Rothbart, M.K., Fan, M., & Posner, M. 2007. Short-term meditation training improves attention and self-regulation. *PNAS*, 104:17152-17156.
- Thompson, E. & Varela F.J. 2001. Radical embodiment: Neural dynamics and consciousness. *Trends in Cognitive Sciences*, 5:418-425.
- Walsh, R. & Shapiro, S. L. 2006. The meeting of meditative disciplines and Western psychology: A mutually enriching dialogue. *American Psychologist*, 61:227-239.

# Where to Find Rick Hanson Online

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## ***Hardwiring Happiness: The New Brain Science of Contentment, Calm, and Confidence***

[www.rickhanson.net/hardwiringhappiness](http://www.rickhanson.net/hardwiringhappiness)

Personal website: [www.rickhanson.net](http://www.rickhanson.net)

Wellspring Institute: [www.wisebrain.org](http://www.wisebrain.org)



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